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Abstract of the national paper of Poland

1. Space activities in Poland are being conducted mainly in the following three fields: (a) space physics; (b) remote sensing; and (c) planetary geodesy.

2. The main institutions involved in such activities are: (a) the Space Research Centre of the Polish Academy of Sciences; (b) the Institute of Geodesy and Cartography; (c) the Astronomical Copernicus Centre of the Polish Academy of Sciences; (d) Warsaw University; and (e) the Warsaw University of Technology.

3. All activity in space research in Poland is coordinated by the Committee on Space Research (COSPAR), a body affiliated to the Polish Academy of Sciences, which also acts as COSPAR National Bureau.

4. It is probably worth recalling that this activity started at the very beginning of the space era, from the time the first Sputnik was launched by the Union of Soviet Socialist Republics, although those first steps were limited to optical observations. The real introduction to orbital experimentation was made in 1973, however, when the Kopernik-500 project, named in commemoration of the 500th anniversary of the birth of Nicolaus Copernicus, was designed and prepared by a team of Polish scientists from Torun and Warsaw. That experiment, an investigation of plasma waves, was flown on board the Intercosmos-9 satellite. Since that time almost 40 individual scientific instruments have been located on board different satellites or space stations and 24 on sounding rockets. Among them are the Comet Halley-Vega mission and the Cassini spacecraft, which is now travelling on its long journey to Saturn and Titan. The main objective of the current Polish programme in the field of space physics is research into space plasma, planetology and space-related astrophysics. Polish scientists are now involved in the preparation of instruments for the following missions: the Rosetta flight to the Comet Wirtanen and landing on the core of the comet, the Mars Express, a European Space Agency (ESA) mission to the planet Mars, Integral, an ESA astrophysical mission, and the French Demeter satellite to study the electromagnetic environment of the Earth.

5. A special chapter in the chronicle of Polish space efforts was the manned flight of astronaut Miroslaw Hermaszewski, which took place in 1978 as part of the Intercosmos programme. During the seven-day flight a number of scientific experiments were performed, including crystallization of HgCdTe in microgravity and a wide range of aerospace medicine experiments.

6. Apart from fundamental science, the application programmes were performed in satellite geodesy, remote sensing and to a lesser extent space technology. The modern fundamental geodetic network for Poland is based totally on the Global Positioning System technique. The laser ranging system operates continuously, tracking satellites with centimetre-level precision. Satellite data are used for cartography, environment monitoring and spatial planning in agriculture and even for disaster prediction.

7. The most important results of satellite remote sensing applications include preparation of a database containing a land-cover map for the whole of Poland on the basis of Landsat thematic mapper images. The map is widely used for different types of environmental study. The crop condition assessment system, based on operational use of meteorological satellite images from the National Oceanic and Atmospheric Administration of the United States of America, was prepared recently and is being used effectively for the monitoring of crop growth in Poland, as well as for the prediction of drought and the estimation of yields. High-resolution satellite data are used in the creation of forest information systems, as well as in large-scale monitoring of changes in forests resulting from human activity and natural disasters.

8. Another application of satellites in Poland is in meteorology. The first experiments using meteorological satellite data were conducted from 1963 to 1967 at the Rocket and Satellite Research Department of the Institute of Meteorology and Water Management in Crakow. Since 1967, meteorological satellite data have been used regularly there. Since 1979, satellite data from the Meteosat geostationary satellite are received and used in Crakow. A new receiving station for both geostationary and polar orbiting satellites was installed in 1996.

9. Over the last 31 years of satellite data use, many scientific research projects have been completed. The main topics concern the use of satellite data in meteorology (clouds, rain, distribution of temperature and moisture in the atmosphere), hydrology (use of satellite data in hydrological modelling), monitoring of the environment (vegetation monitoring, snow and ice detection, radiation levels) and oceanology. Since 1993 maps showing total ozone levels over central Europe are prepared from daily readings of satellite data.

10. The Institute of Meteorology and Water Management cooperates closely with the European Organization for the Exploitation of Meteorological Satellites. Poland will become a cooperating member of the Organization in the very near future.

11. Space activities in Poland are now based on international cooperation, first and foremost with ESA member countries. In 1994 the Government of Poland signed a cooperation agreement with the Agency, opening the door for active participation of Polish scientific groups in ESA space missions and programmes. In the next few years that cooperation will be intensified, as the major focus of space activities in Poland. However, cooperation with other partners, such as the National Aeronautics and Space Administration of the United States, the Russian Space Agency and Ukraine, will be continued and strengthened.